

Prevalence And Risk Factors of Eye Allergies Among Adults In Ksa: A Cross-Sectional Study

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RESERACH

Please cite this paper as: Morfeq H, Alqarni AD, Talea KA, Alshammari RK, Alghamdi AA, Alghamdi HA, Bukhari OF, AlGaedy RA, Alhenaki AS, Alanazi IL, Alghamdi RS, Alturki AA, Ghulaysi S, Alqahtani AM. Prevalence And Risk Factors of Eye Allergies Among Adults In Ksa: A Cross-Sectional Study. AMJ 2023;16(12):911-923.

<https://doi.org/10.21767/AMJ.2023.3995>

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ABSTRACT

Objective

To determine the prevalence of eye allergies and associated risk factors among adults in KSA.

Methods

This research employs a cross-sectional study design to assess the prevalence and risk factors of eye allergies among adults in the Kingdom of Saudi Arabia (KSA). A cross-sectional approach allows for the collection of data at a single point in time, providing a snapshot of the condition's status within the study population.

Results

The study included 640 participants. The most frequent age among them was 18-28 years (n= 331, 51.7 Per Cent), followed by 40-50 years (n= 139, 21.7 Per Cent). The most frequent gender among study participants was female (n= 389, 60.8 Per Cent) followed by male (n= 251, 39.2 Per Cent). The most frequent nationality among study participants was Saudi (n= 613, 95.8 Per Cent) followed by non-Saudi (n= 27, 4.2 Per

Cent). The educational level among study participants with most of them being the university (n= 553, 86.4 Per Cent) followed by the school (n= 85, 13.3 Per Cent). The work nature among study participants with most of was inside the building. Participants were asked if they had an eye problem that affected their daily life. The most frequent answer was moderately (n= 309, 48.3 Per Cent) followed by never (n= 271, 42.3 Per Cent), and the least was a lot (n=60, 9.4 Per Cent).

Conclusion: The results of the study showed that most of the study participants are Saudis and most of them work inside the building. The majority have university education, and the largest percentage of participants are women. Most of the participants are non-smokers. Most study participants had good social communication.

Introduction

Since it was initially recognized as a medical condition more than 30 years ago, the definition of dry eye disease (DED) has evolved several times. The 2017 Dry Eye Workshop II of the Tear Film and Ocular Surface Society (TFOS DEWS II) defined DED as a "multifactorial disease of the ocular surface characterized by a loss of homeostasis of the tear film, and accompanied by ocular symptoms, in which tear film instability and hyperosmolarity, ocular surface inflammation and damage, and neurosensory abnormalities play etiological roles"¹⁻¹⁰.

Increasing age, female gender, co-morbidities including hypertension and diabetes mellitus, and the use of drugs like antidepressants are all risk factors for DED.[2,3] Epidemiological studies in the US, AU, and AS have shown DED prevalence to be anywhere from 5 Per Cent to 50 Per Cent[4,5]. Still, research' varying definitions of DED contribute to the discrepancies in prevalence.

The frequency of DED is between 32.1 to 74.9 percent in Saudi Arabia, a country where environmental and epidemiological variables raise the danger of dry eye [6-10]. However, most research were conducted in just one city, limiting their applicability. The major objective of the present investigation was, therefore, to ascertain the prevalence of DED among adults in Saudi Arabia as diagnosed by physicians and to assess the related risk factors. The secondary purpose of the research was to evaluate the monetary burden of DED by determining how much lubricant is used and how much that use costs on a yearly basis.

The research problem at the heart of this study revolves around understanding the prevalence and risk factors of eye allergies among adults in the Kingdom of Saudi Arabia (KSA). Eye allergies, also known as allergic conjunctivitis, can significantly affect an individual's quality of life by causing symptoms like itching, redness, tearing, and blurred vision. Despite the considerable impact of this condition, there is a lack of comprehensive epidemiological data specific to the KSA adult population. This research problem seeks to address this gap by determining the extent of the issue and identifying potential risk factors unique to the region.

One aspect of the research problem is to quantify the prevalence of eye allergies in KSA. This involves conducting a cross-sectional study to collect data from a representative sample of adults in the country. Understanding the extent of eye allergies in KSA is essential for healthcare planning and resource allocation, as it helps in assessing the burden of this condition on the healthcare system and the overall well-being of the population.

Another key aspect of the research problem is to identify the risk factors associated with eye allergies in KSA. By investigating the specific factors that contribute to the development of eye allergies, researchers can offer insights into their causation. This information can help in tailoring prevention strategies, developing treatment protocols, and raising awareness among at-risk individuals. Additionally, uncovering unique risk factors within the Saudi Arabian context may contribute to the broader field of allergy research, aiding in the development of international guidelines and strategies to mitigate eye allergies. In summary, the research problem is a crucial step in addressing the prevalence and risk factors of eye allergies among adults in KSA, ultimately improving the health and well-being of the population.

Methods

Study design

This research employs a cross-sectional study design to assess the prevalence and risk factors of eye allergies among adults in the Kingdom of Saudi Arabia (KSA). A cross-sectional approach allows for the collection of data at a single point in time, providing a snapshot of the condition's status within the study population.

Study approach

The study is conducted in multiple urban and rural regions across KSA to ensure a representative sample. A diverse set of locations is chosen to account for potential regional variations in eye allergy prevalence and risk factors.

Study population

The target population consists of adults (18 years and older) residing in KSA. Adults from all walks of life, with varying demographic and socio-economic backgrounds, are included to ensure a broad representation.

Study sample

A stratified random sampling technique is used to select participants. The strata are determined based on geographical regions within KSA. The sample size is calculated to achieve statistical significance and power, with considerations for potential non-response and dropout rates.

Study tool

For the current study, a questionnaire was adopted for data collection, which was also categorized as a study tool.

Data collection

Data is collected through structured interviews and questionnaire-based surveys. Trained research personnel conduct face-to-face interviews to elicit information regarding eye allergy symptoms, medical history, lifestyle factors, and potential risk exposures. The data collection process is conducted over a specified period to ensure uniformity and minimize seasonal variations.

Data analysis

Descriptive statistics are used to summarize the prevalence of eye allergies and risk factors. Bivariate and multivariate statistical analyses, such as chi-square tests and logistic regression, are employed to identify significant risk factors associated with eye allergies.

Ethical considerations

The study follows ethical guidelines, obtaining informed consent from all participants before data collection. Anonymity and confidentiality are maintained throughout the study, and participants are assured of the secure

handling of their data. The study also obtains the necessary ethical approvals from relevant institutional review boards or ethics committees in compliance with national and international research ethics standards.

Results

The study included 640 participants. The most frequent age among them was 18-28 years (n= 331, 51.7 Per Cent), followed by 40-50 years (n= 139, 21.7 Per Cent). Figure 1 shows the age distribution among study participants. The most frequent gender among study participants was female (n= 389, 60.8 Per Cent) followed by male (n= 251, 39.2 Per Cent). Figure 2 shows the gender distribution among study participants. The most frequent nationality among study participants was Saudi (n= 613, 95.8 Per Cent) followed by non-Saudi (n= 27, 4.2 Per Cent). Figure 3 shows the distribution of nationality among study participants.

The educational level among study participants with most of them being the university (n= 553, 86.4 Per Cent) followed by the school (n= 85, 13.3 Per Cent).

The work nature among study participants with most of was inside the building. The perceived work nature is presented in Figure 4.

Participants were asked to assess their diseases. Their responses and results are presented in Table 1.

Participants were asked if they had an eye problem that affected their daily life. The most frequent answer was moderately (n= 309, 48.3 Per Cent) followed by never (n= 271, 42.3 Per Cent), and the least was a lot (n=60, 9.4 Per Cent). Figure 5 shows participants' answers about the eye affected their daily lives.

Discussion

The prevalence of allergic disorders has skyrocketed in recent decades¹¹⁻¹⁴. One of the most prevalent eye disorders seen in the clinic is ocular allergies. It is impossible to attribute this rise to a single cause, therefore scientists are looking at a wide range of potential contributors, such as urban air pollution, pets, and exposure in early infancy¹⁵. As more people need allergy therapy, the accompanying expenses have skyrocketed¹⁶. Ocular allergies may cause uncomfortable symptoms, and in extreme cases, such with atopic keratoconjunctivitis, they can even cause permanent vision loss.

Seasonal Conjunctivitis (SAC), Perennial Conjunctivitis (PAC), Vernal Keratoconjunctivitis (VKC), and Atopic Conjunctivitis

(AKC) are all forms of allergic conjunctivitis. Despite sharing certain similar indicators of allergy, AKC and VKC have clinical and pathophysiological aspects that are extremely distinct from SAC and PAC¹⁷. Commonly referred to as "contact lens or ocular prosthesis-associated Giant Papillary Conjunctivitis" (GPC), this condition is better understood as a chronic ocular micro-trauma-related disorder that requires the joint management of ophthalmologists and contact lens specialists¹⁸.

Every professional who works with patients who suffer from ocular allergy might benefit from learning more about the disease's immunologic causes, clinical characteristics, differential diagnosis, and treatment options. To achieve this goal, we conducted a comprehensive literature analysis highlighting all of the different types of ocular allergy.

Allergic conjunctivitis

Seasonal and perennial allergic conjunctivitis:

Ocular allergies often manifest as either seasonal (SAC) or Perennial (PAC) Allergic Conjunctivitis. Somewhere between 15 and 20 Per Cent of the population is thought to be allergic to these substances¹⁹. In virtually all instances of SAC and PAC, the presence of specific IgE antibodies to a seasonal or perennial allergen may be shown²⁰.

Clinical ocular allergy is triggered by allergens interacting with IgE attached to sensitized mast cells, which causes the inflammatory reaction known as allergic conjunctivitis. Allergic conjunctivitis is caused by a hypersensitivity response that is mostly IgE-mediated. Histamine, tryptase, prostaglandins, and leukotriene levels in tears are increased when mast cells are activated. This early or immediate reaction often lasts for 20-30 minutes in the clinic.

Vascular endothelial cells get activated in response to mast cell degranulation, and as a result, they produce chemokines and adhesion molecules including ICAM and VCAM. Monocyte chemoattractant protein (MCP), interleukin (IL)-8, eotaxin, and macrophage inflammatory protein (MIP)-1 alpha are some of the other chemokines that are released. RANTES chemokines are also secreted during activation of normal T cells. These substances set off the ocular late-phase response by recruiting inflammatory cells to the conjunctival mucosa^{21,32}.

Both illnesses have similar outward manifestations. It all depends on which allergens the patient is reacting to. Pollens in the air are a common trigger for SAC attacks. The symptoms often worsen in the winter and disappear in the spring and summer. Perennial allergens may trigger PAC at any time of the year. Conjunctival symptoms including

itching, redness, and swelling are used to diagnose SAC and PAC. Injection of the conjunctiva causes mild to severe redness. Chemosis, or swelling of the conjunctiva, is usually not very severe but is more noticeable than usual given the relatively low degree of redness. In both SAC and PAC, itching is a common symptom. Involvement of the cornea is uncommon.

Conclusion

The results of the study showed that most of the study participants are Saudis and most of them work inside the building. The majority have a university education, and the largest percentage of participants are women. Most of the participants are non-smokers. Most study participants had good social communication.

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Tables & Figures

Table 1: diseases among study participants.

| survey item | Yes | No |
|--|---------------------|---------------------|
| Are you currently a smoker? | 137 21.40 % | 503 78.60 % |
| Have you ever faced the problem of itchy eyes? | 425 66.40 % | 215 33.60 % |
| Have you ever faced the problem of excessive tears? | 310 48.40 % | 330 51.60 % |
| Have you ever had difficulty seeing light? | 384 60.00 % | 256 40.00 % |
| Have you ever felt sand in the eye? | 295 46.10 % | 345 53.90 % |
| Have you ever suffered from allergic conjunctivitis? | 79 12.30 % | 561 87.70 % |
| Do you think eye allergies can affect vision? | 533.00 % 83.30 % | 107.00 % 16.70 % |
| Do you think eye allergies can be avoided? | 517 80.80 % | 123 19.20 % |
| Do you think eye allergies is a contagious disease? | 176 27.50 % | 464 72.50 % |
| Do you feel that it is easy to overcome the problem of eye allergy without taking any treatment? | 192 30.00 % | 448 70.00 % |
| Do you think eye allergies can be genetically transmitted? | 318 49.70 % | 322 50.30 % |

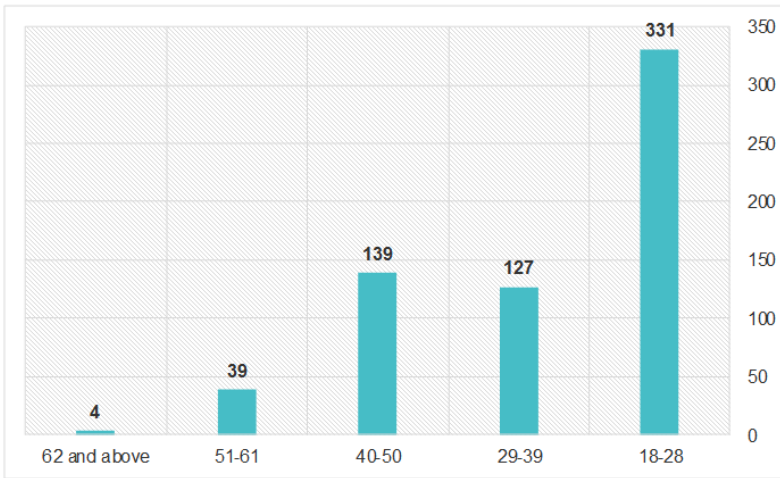


Figure 1: Age distribution among study participants.

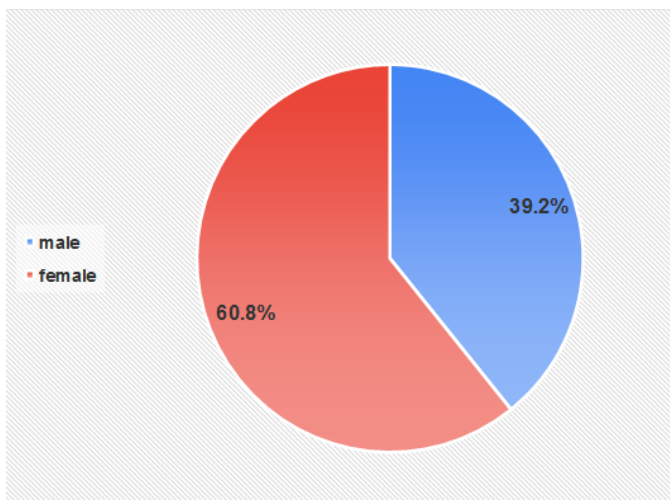


Figure 2: Gender distribution among study participants.

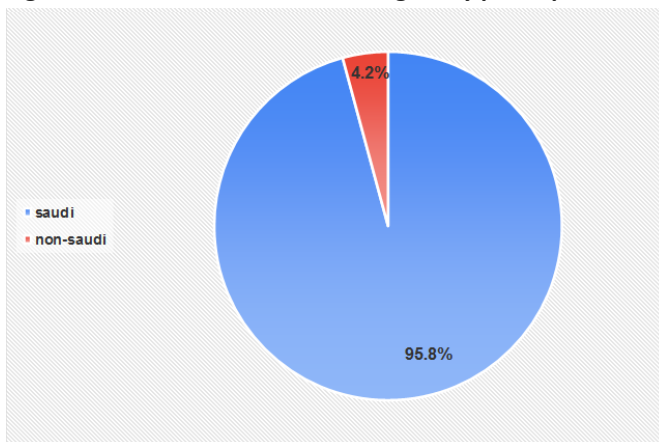


Figure 3: Nationality distribution among study participants.

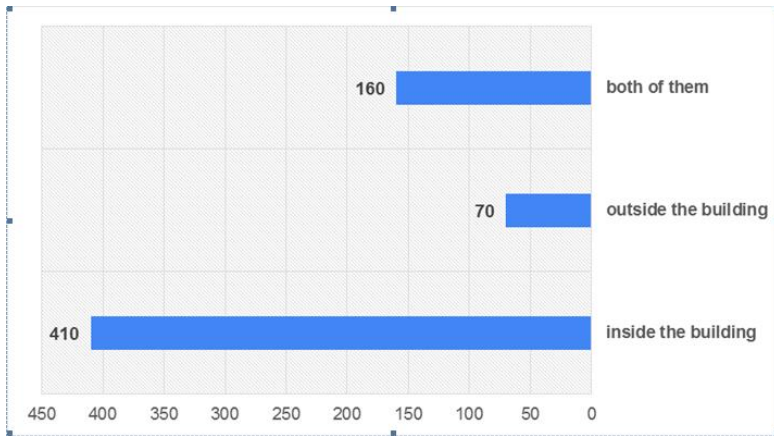


Figure 4: Work nature distribution among study participants.

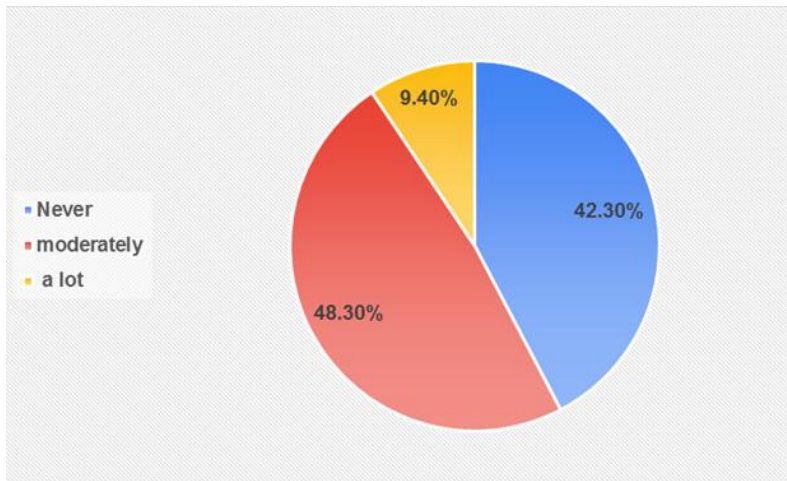


Figure 5: Participants' eye problem affected their daily life.

Prevalence And Risk Factors of Eye Allergies Among Adults In Ksa: A Cross-Sectional Study

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ANNEXURE 1: DATA COLLECTION TOOL

1. What is your gender?
 - Male
 - Female
2. How old are you?
 - 18-28
 - 29-39
 - 40-50
 - 51-61
 - 62 and above
3. What is your nationality?
 - Saudi
 - Non-Saudi
4. What is your educational level?
 - uneducated
 - the school
 - the university
5. what is your work nature?
 - Inside the building
 - Outside the building
 - Both of them
6. Do you have one of the following diseases?
 - Diabetes
 - High blood pressure disease
 - Asthma
 - Lupus erythematosus
 - Ulcerative colon disease
- Arthritis disease
- Diseases of the immune system
- None of the above
7. Are you currently a smoker?
 - Yes
 - No
8. Do you have any type of allergy?
 - Allergy to dirt
 - Allergy to the vaccine
 - Allergy to a particular type of food
 - Allergy to perfumes
 - Allergy to pets
 - None of the above
9. Have you ever faced the problem of itchy eyes?
 - Yes
 - No
10. Have you ever faced the problem of excessive tears?
 - Yes
 - No
11. Have you ever had difficulty seeing light?
 - Yes
 - No
12. Have you ever felt sand in the eye?
 - Yes
 - No
13. Has the eye problem affected your daily life?

- Never
 - moderately
 - a lot
14. Have you ever suffered from allergic conjunctivitis?
- Yes
 - No
15. Do you think eye allergies can affect vision?
- Yes
 - No
16. Do you think eye allergies can be avoided?
- Yes

- No
17. Do you think eye allergies is a contagious disease?
- Yes
 - No
18. Do you feel that it is easy to overcome the problem of eye allergy without taking any treatment?
- Yes
 - No
19. Do you think eye allergies can be genetically transmitted?
- Yes
 - No

APPENDIX 2: Participants responses to scale items

| variable | | Frequency | Percent |
|-------------------|--------------|-----------|---------------|
| Age | 18-28 | 331 | 51.7 Per Cent |
| | 29-39 | 127 | 19.8 Per Cent |
| | 40-50 | 139 | 21.7 Per Cent |
| | 51-61 | 39 | 6.1 Per Cent |
| | 62 and above | 4 | 0.6 Per Cent |
| Gender | male | 251 | 39.2 Per Cent |
| | female | 389 | 60.8 Per Cent |
| educational level | uneducated | 2 | 0.3 Per Cent |
| | the school | 85 | 13.3 Per Cent |

| | | | |
|-------------|----------------------|-----|---------------|
| | the university | 553 | 86.4 Per Cent |
| nationality | Saudi | 613 | 95.8 Per Cent |
| | non-Saudi | 27 | 4.2 Per Cent |
| work nature | inside the building | 410 | 64.1 Per Cent |
| | outside the building | 70 | 10.9 Per Cent |
| | both of them | 160 | 25.0 Per Cent |

| Has the eye problem affected your daily life? | |
|---|---------------------|
| Never | 271 (42.3 Per Cent) |
| moderately | 309 (48.3 Per Cent) |
| a lot | 60 (9.4 Per Cent) |

| Do you have one of the following diseases? (more than one) | | |
|--|-----------|--------------|
| | Frequency | Percent |
| Diabetes | 63 | 9.1 Per Cent |
| High blood pressure disease | 46 | 6.6 Per Cent |
| Asthma | 55 | 7.9 Per Cent |
| Lupus erythematosus | 2 | 0.3 Per Cent |
| Ulcerative colon disease | 14 | 2.0 Per Cent |

| | | | | | | | |
|-------------------------------|-----|---------------|-------|--------------|-----|-----|-----|
| Arthritis disease | 48 | 6.9 Per Cent | | 62 and above | 1 | 3 | 4 |
| Diseases of the immune system | 10 | 1.4 Per Cent | | | | | |
| None of the above | 458 | 65.8 Per Cent | Total | | 310 | 330 | 640 |

| Do you have any type of allergy? (more than one) | | |
|--|-----------|---------------|
| | Frequency | Percent |
| Allergy to dirt | 110 | 14.1 Per Cent |
| Allergy to the vaccine | 40 | 5.1 Per Cent |
| Allergy to a particular type of food | 102 | 13.1 Per Cent |
| Allergy to perfumes | 85 | 10.9 Per Cent |
| Allergy to pets | 84 | 10.8 Per Cent |
| None of the above | 360 | 46.1 Per Cent |

| Chi-Square Tests | | | |
|------------------------------|---------------------|----|-----------------------------------|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 16.673 ^a | 4 | 0.002 |
| Likelihood Ratio | 17.628 | 4 | 0.001 |
| Linear-by-Linear Association | 12.311 | 1 | 0.000 |
| N of Valid Cases | 640 | | |

Chi-square

| Crosstab | | | | |
|----------|--------------|-----------|-----|-------|
| Count | | | | |
| | | Itchy eye | | Total |
| | | yes | no | |
| age | 18-28 | 213 | 118 | 331 |
| | 29-39 | 88 | 39 | 127 |
| | 40-50 | 102 | 37 | 139 |
| | 51-61 | 21 | 18 | 39 |
| | 62 and above | 1 | 3 | 4 |
| Total | | 425 | 215 | 640 |

| Crosstab | | | | |
|----------|--------------|-------------------------|-----|-------|
| Count | | | | |
| | | Difficulty seeing light | | Total |
| | | yes | no | |
| age | 18-28 | 193 | 138 | 331 |
| | 29-39 | 76 | 51 | 127 |
| | 40-50 | 95 | 44 | 139 |
| | 51-61 | 18 | 21 | 39 |
| | 62 and above | 2 | 2 | 4 |
| Total | | 384 | 256 | 640 |

| Chi-Square Tests | | | |
|------------------------------|--------------------|----|-----------------------------------|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 9.964 ^a | 4 | .041 |
| Likelihood Ratio | 9.750 | 4 | .045 |
| Linear-by-Linear Association | 0.021 | 1 | .885 |
| N of Valid Cases | 640 | | |

| Chi-Square Tests | | | |
|------------------------------|--------------------|----|-----------------------------------|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 7.712 ^a | 4 | .103 |
| Likelihood Ratio | 7.749 | 4 | .101 |
| Linear-by-Linear Association | .174 | 1 | .676 |
| N of Valid Cases | 640 | | |

| Crosstab | | | | |
|----------|-------|-----------------|-----|-------|
| Count | | | | |
| | | Excessive tears | | Total |
| | | yes | no | |
| age | 18-28 | 175 | 156 | 331 |
| | 29-39 | 64 | 63 | 127 |
| | 40-50 | 62 | 77 | 139 |
| | 51-61 | 8 | 31 | 39 |

| Crosstab | | | |
|----------|--|----------|-------|
| Count | | | |
| | | Sand eye | |
| | | yes | no |
| | | | Total |

| | | | | |
|-------|--------------|-----|-----|-----|
| age | 18-28 | 143 | 188 | 331 |
| | 29-39 | 60 | 67 | 127 |
| | 40-50 | 74 | 65 | 139 |
| | 51-61 | 17 | 22 | 39 |
| | 62 and above | 1 | 3 | 4 |
| Total | | 295 | 345 | 640 |

| Chi-Square Tests | | | |
|------------------------------|--------------------|----|-----------------------------------|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 4.851 ^a | 4 | .303 |
| Likelihood Ratio | 4.885 | 4 | .299 |
| Linear-by-Linear Association | 1.403 | 1 | .236 |
| N of Valid Cases | 640 | | |

| Crosstab | | | | | |
|----------|--------------|------------------------|------------|-------|-------|
| Count | | | | | |
| | | Eye problem daily life | | | Total |
| | | never | moderately | A lot | |
| age | 18-28 | 141 | 159 | 31 | 331 |
| | 29-39 | 51 | 68 | 8 | 127 |
| | 40-50 | 55 | 68 | 16 | 139 |
| | 51-61 | 23 | 13 | 3 | 39 |
| | 62 and above | 1 | 1 | 2 | 4 |
| Total | | 271 | 309 | 60 | 640 |

| Chi-Square Tests | | | |
|------------------------------|---------------------|----|-----------------------------------|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 15.348 ^a | 8 | 0.053 |
| Likelihood Ratio | 11.954 | 8 | 0.153 |
| Linear-by-Linear Association | .001 | 1 | 0.982 |
| N of Valid Cases | 640 | | |

| Crosstab | | | | |
|----------|--------------|-------------------------|-----|-------|
| Count | | | | |
| | | Allergic conjunctivitis | | Total |
| | | yes | no | |
| age | 18-28 | 34 | 297 | 331 |
| | 29-39 | 20 | 107 | 127 |
| | 40-50 | 19 | 120 | 139 |
| | 51-61 | 5 | 34 | 39 |
| | 62 and above | 1 | 3 | 4 |
| Total | | 79 | 561 | 640 |

| Chi-Square Tests | | | |
|------------------------------|--------------------|----|-----------------------------------|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 3.499 ^a | 4 | .478 |
| Likelihood Ratio | 3.351 | 4 | .501 |
| Linear-by-Linear Association | 1.603 | 1 | .206 |
| N of Valid Cases | 640 | | |

| Crosstab | | | | |
|----------|--------------|---------------|-----|-------|
| Count | | | | |
| | | Affect vision | | Total |
| | | yes | no | |
| age | 18-28 | 273 | 58 | 331 |
| | 29-39 | 109 | 18 | 127 |
| | 40-50 | 115 | 24 | 139 |
| | 51-61 | 34 | 5 | 39 |
| | 62 and above | 2 | 2 | 4 |
| Total | | 533 | 107 | 640 |

| Chi-Square Tests | | | |
|--------------------|--------------------|----|-----------------------------------|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 4.382 ^a | 4 | .357 |
| Likelihood Ratio | 3.596 | 4 | .464 |

| | | | |
|------------------------------|------|---|------|
| Linear-by-Linear Association | .010 | 1 | .921 |
| N of Valid Cases | 640 | | |

| Crosstab | | | | |
|----------|--------------|-----------------------|-----|-------|
| Count | | | | |
| | | Eye allergies avoided | | Total |
| | | yes | no | |
| age | 18-28 | 265 | 66 | 331 |
| | 29-39 | 103 | 24 | 127 |
| | 40-50 | 120 | 19 | 139 |
| | 51-61 | 28 | 11 | 39 |
| | 62 and above | 1 | 3 | 4 |
| Total | | 517 | 123 | 640 |

| Chi-Square Tests | | | |
|------------------------------|---------------------|----|-----------------------------------|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 12.922 ^a | 4 | 0.012 |
| Likelihood Ratio | 10.775 | 4 | 0.029 |
| Linear-by-Linear Association | .129 | 1 | 0.719 |
| N of Valid Cases | 640 | | |

| Crosstab | | | | |
|----------|--------------|--------------------------------|-----|-------|
| Count | | | | |
| | | Eye allergy contagious disease | | Total |
| | | yes | no | |
| age | 18-28 | 91 | 240 | 331 |
| | 29-39 | 48 | 79 | 127 |
| | 40-50 | 32 | 107 | 139 |
| | 51-61 | 5 | 34 | 39 |
| | 62 and above | 0 | 4 | 4 |
| Total | | 176 | 464 | 640 |

| Chi-Square Tests | | | |
|------------------------------|--------------------|----|-----------------------------------|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 7.792 ^a | 4 | .100 |
| Likelihood Ratio | 7.805 | 4 | .099 |
| Linear-by-Linear Association | 4.384 | 1 | .036 |
| N of Valid Cases | 640 | | |

| | Value | df | Asymptotic Significance (2-sided) |
|------------------------------|---------------------|----|-----------------------------------|
| Pearson Chi-Square | 13.882 ^a | 4 | 0.008 |
| Likelihood Ratio | 15.259 | 4 | 0.004 |
| Linear-by-Linear Association | 3.404 | 1 | 0.065 |
| N of Valid Cases | 640 | | |

| Crosstab | | | | |
|----------|--------------|----------------------------|-----|-------|
| Count | | | | |
| | | Overcome without treatment | | Total |
| | | yes | no | |
| age | 18-28 | 114 | 217 | 331 |
| | 29-39 | 33 | 94 | 127 |
| | 40-50 | 33 | 106 | 139 |
| | 51-61 | 10 | 29 | 39 |
| | 62 and above | 2 | 2 | 4 |
| Total | | 192 | 448 | 640 |

| Chi-Square Tests | | | |
|------------------------------|--------------------|----|-----------------------------------|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 7.792 ^a | 4 | .100 |
| Likelihood Ratio | 7.805 | 4 | .099 |
| Linear-by-Linear Association | 4.384 | 1 | .036 |
| N of Valid Cases | 640 | | |

| Crosstab | | | | |
|----------|-------|-------------------------|-----|-------|
| Count | | | | |
| | | Genetically transmitted | | Total |
| | | yes | no | |
| age | 18-28 | 152 | 179 | 331 |
| | 29-39 | 69 | 58 | 127 |
| | 40-50 | 73 | 66 | 139 |

| | | | | |
|-------|--------------|-----|-----|-----|
| | 51-61 | 22 | 17 | 39 |
| | 62 and above | 2 | 2 | 4 |
| Total | | 318 | 322 | 640 |

| Chi-Square Tests | | | |
|------------------------------|--------------------|----|-----------------------------------|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 4.124 ^a | 4 | 0.390 |
| Likelihood Ratio | 4.129 | 4 | 0.389 |
| Linear-by-Linear Association | 2.907 | 1 | 0.088 |
| N of Valid Cases | 640 | | |